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ABSTRACT

Presented is a report on the effectiveness of a project designed to serve elementary grade learning disabled (LD) students in rural Burke County, North Dakota. A brief description of the project includes a listing of the five performance objectives and evaluation criteria, and expenditure statistics. Tables provide data on program effectiveness, including performance results on the Wechsler Intelligence Scale for Children, The Wide Range Achievement Test and the Key Math Test. (CL)

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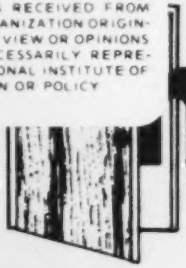

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NORTHWEST SPECIAL EDUCATION

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USOE DISSEMINATION REVIEW PANEL REPORT

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DEVELOPER/DEMONSTRATOR PROJECT

Lignite, North Dakota

USOE
DISSEMINATION
REVIEW PANEL
REPORT

REPORT FOR:

USOE DISSEMINATION REVIEW PANEL

I. PROGRAM AREA:

Handicapped – Specific Learning Disabilities

II. PROJECT TITLE:

Northwest Special Education Model

III. LOCATION:

Lignite, North Dakota 58752

IV. SOURCE AND LEVEL FUNDING:

North Dakota ESEA Grant No. 44-72-0009-2

ESEA Title III Funds	$25,000.06
Other Funds	14,847.37
	$39,847.43

V. PROGRAM START DATE:

1 July 1971

VI: BRIEF DESCRIPTION OF PROJECT:

The main goal of the project is to provide diagnosis, prescriptive, and remediation services to previously unserved rural children with Learning Disabilities in Burke County, North Dakota. To accomplish this goal a process was implemented and Instructional Materials and Methods (IMM) were designed in order to meet the needs of the individual learner. The IMM included modification and adaptation of commercial programs to match the Learning Disabled child's need for sequentially-based instruction.

A. The specific performance objectives are:

OBJECTIVE No. 1:

After participating in the program for not more than 25 hours of one-to-one tutoring, Level I Learning Disabled students will, on the average, increase .5 SD in knowledge of remediated area(s) as measured by the Wold Screening Tests and the Silvaroli Reading Inventory.

Instruments:

Subtest 1 (WOLD: Alphabet Writing, Spontaneous) required the LD students to spontaneously write the alphabet on a lined paper with no prompts. (26 capital manuscript, 26 small manuscript, 26 capital cursive, and 26 small cursive - total responses possible 104).

Subtest 2 (WOLD: Alphabet Writing, Dictation) required the LD students to write 25 randomly selected capital and/or lower case letters from dictation. (May be manuscript or cursive, an objective decision individually determined). Total responses possible 25.

Subtest 3 (WOLD: Say Letter Names and Sounds) required the LD student to say the letter names and sounds of the alphabet. (26 names, 26 sounds - total responses possible 52).

Subtest 4 (WOLD: Write Consonants, etc.) required the LD student to write the letter(s) that he hears in the initial position - includes consonants, blends, vowels, diagraphs, and vowel combinations. (Consonants 19, blends 22, diagraphs 5, vowels 10, vowel combinations 9 - total responses possible 65). Consonants - discontinue testing after 10 errors. Blends - discontinue testing after 10 consecutive errors. Vowels - discontinue after 5 consecutive errors.

Subtest 5 (SILVAROLI: Word Lists) required the LD student to say words from the word lists of the Silvaroli Reading Inventory. PP through Level 6 included 20 words each. Total possible responses 160. Discontinue after 5 errors in the 20 words at any level.

Subtest 6 (SILVAROLI: Spelling) required the LD student to spell by writing dictated words from the Silvaroli Reading Inventory spelling list. Level 1 - Level VII include 15 words each. Total possible responses 105. Discontinue after 5 errors in the 15 words at any level.

OBJECTIVE No. 2:

After participating in the program for not more than 25 hours of one-to-one tutoring, Level I Learning Disabled students will, on the average, increase .5 SD in manipulative aspects of remediated areas as measured by the Wechsler Intelligence Scale for Children (WISC).

Instruments:

The Wold Screening Test, subtest 1 (Alphabet writing spontaneous), subtest 2 (alphabet writing dictation), and subtest 4 (write consonants, blends, diagraphs, vowels, and vowel combinations) were deemed manipulative tasks

along with the performance subtest of the WISC. The WISC was the only normed test used and has an average Deviation IQ of 100 and SD of 15.

OBJECTIVE No. 3:

After participating in the program for not more than 25 hours of one-to-one tutoring, Level II Learning Disabled students will, on the average, increase .5 SD in knowledge of remediated area(s) as measured by the Wide Range Achievement Test (WRAT) and the Key Math Test.

Instruments:

The Wide Range Achievement Test (WRAT) subtests of Spelling (51 possible responses to words dictated from a list in the Manual) and Arithmetic (56 possible responses to 10 oral and 46 written problems) were used.

The Key Math Test is a spiral-bound easel booklet in which the instructor presents visual or symbolic clues to the student who responds orally except for a small written section on the 4 basic mathematical operations (209 total possible responses).

OBJECTIVE No. 4:

After participating in the program for not more than 25 hours of one-to-one tutoring, Level I Learning Disabled students will increase positive behavior significantly (.05 level) according to teacher judgment on the Northwestern Pupil Behavior Rating Scale (PBRS).

Instrument:

The Northwestern Pupil Behavior Rating Scale involved teacher ratings of student behavior on 24 Likert type items for a total of 120 possible points.

OBJECTIVE No. 5:

After participating in the program for not more than 25 hours of one-to-one tutoring, Level II Learning Disabled students will increase positive behavior significantly (.05 level) according to teacher judgment on the Northwestern Pupil Behavior Rating Scale.

B. Educational Significance:

By definition, Learning Disabled children do not make gains in the regular curriculum. They have a history of being unable to achieve within one year of their grade level on standardized tests and sometimes are unable to achieve anything on standardized tests (e.g.) the Spelling sub-test of the ITBS was too difficult for some of these LD students to achieve anything but chance scores. Since these students do not learn incidentally, learning opportunities must be structured to their specific individual needs with sequentially-based instruction. Therefore, measure-

ment of their achievement must be referenced to the type of instruction they receive.

Since the measurement was accomplished on tests without established norms (with exception of the WISC) .5 Standard Deviation of the pre-test mean was used as a criterion for the gain expected. Using the pre-test as a norm, this would move the group average from the 50th percentile to the 69th percentile, a gain which the instructors believed was possible for this type of instruction. Without this instruction there would be no expected gain, since the students do not learn incidentally.

Objectives 4 and 5 contained the .05 statistical level of significance between pre and post test means as a criterion for successful behavioral change. This projection was postulated because of the less certain status of teacher observation on behavioral gains. Because of the small N, it was hypothesized that the .05 level would be indicative of educational significance for improvement in student behaviors as measured by teacher observations recorded on the rating scales of the PBRS.

C. Context:

Burke County is a sparsely populated area in Northwest North Dakota noted primarily for small grain farming, ranching, and some limited oil and coal development. There are no other major industries. The Lignite School is the project resource center and serves four other school districts: Powers Lake, Columbus, Flaxton, and Bowbells. These communities range in population from less than 100 to approximately 600 and are located within a 20 mile radius of Lignite. Burke County is approximately 90 miles from the nearest major city (Minot) where specialized agency resource help is available. The project serves as a reciprocal agent with these agencies from referrals through follow-up activities.

There are approximately 700 students in the five schools in grades 1-8 inclusive. Prior to the project these students lacked the special services found in larger schools such as speech therapy, guidance, and tutorial help. Because of geographical isolation there also tends to be a degree of cultural isolation and lack of cultural opportunities.

D. Program Description:

1. Selection Procedure

Students in project schools were selected for screening procedures based upon the criteria which follows:

a) Performance of at least 1 year below class grade level on a sub-test of a nationally standardized achievement test (SRA Achievement Series or ITBS).

b) Observation by classroom teacher that the student was not functional in an educational skill.

This initial screening procedure was followed by formal and informal evaluation by qualified SLD personnel. The formal procedures included administration of the Wold Screening Tests, the Illinois Test of Psycholinguistic Abilities and the Wechsler Intelligence Scale for Children. Informal procedures included review of student school records, parent interviews and observation of the student during student interviews and in various school settings.

No specific cut-off scores were used, as test results and observations documented the need for student remediation through the specifically designed programs.

2. Operation

During its 3rd year of operation, a total of 38 Learning Disabled students were served by the project and included 19 in grades 1-3 (Level I) and 19 in grades 4-9 (Level II). These 38 LD students were seen by the Itinerant tutor twice weekly in 30 minute sessions which were held in the regular classroom about 25 percent of the time and in workspace outside the classroom the remainder of the time. Individual remediation plans were the core of the program for these students. The remediation plans were carried out by two Itinerant Resource Tutors (Bachelor Degree, teaching certificated) after consultation with the LD consultant (Master's Degree in Learning Disabilities). Thus, the inservice training for the Itinerant Resource Tutors was an on-going activity as they confronted new cases and then had comprehensive consultations with the LD consultant.

3. Materials

Materials include: Commercially prepared kits such as Stern Structural Math, Palo Alto Reading, Open Court Kindergarten, Distar, and selected Developmental Learning Material items and similar programs for children with learning problems. Perhaps the most innovative approach was the construction of materials and the adaption of commercially prepared materials for the LD child. This procedure was followed in order to sequence the learning into a series of smaller steps. Thus, utilizing the locally designed materials, the commercially prepared lessons were broken down into several smaller skills so that LD children could master the lesson. The daily procedure involved hypothesis/testing and hypothesis/formulation techniques to refine a "curriculum match" between the student and the task toward optimum development of cognitive, affective, and psychomotor skills. Students spent an average of 16.09 hours in actual 30 minute tutoring sessions, utilizing the materials and the methods prescribed by the tutor.

4. Cost

The total expenditure of this program for the last completed FY period was $39,847. distributed as follows:

$25,000	ESEA Title III
10,000	Title I
3,275	State Special Education funds
1,572	Local District funds
$39,847	TOTAL

Of the total amount it was determined that operational costs were $30,183 and that continuing developmental costs after the first project year were $9,664. The total developmental costs were estimated at $20,771.

5. Start-up Costs

$11,000	Staff Development
5,830	Clerical, fixed charges, administration
1,619	Equipment
1,585	Travel
737	Materials
$20,771	TOTAL START-UP COSTS

The per pupil operational cost for 38 pupils was $794.29 or $66.19 per month of operation (12 months). A per learner start-up cost of $546.60 was determined by dividing the $20,771 start-up cost by 38 (students served).

VII. EVIDENCE OF EFFECTIVENESS:

A. Person Responsible for Evaluation

The evaluation was conducted by David L. Lee, Ph.D, the State Evaluator for ESEA Title III in North Dakota. In addition to conducting Title III Evaluations, Dr. Lee has published in professional journals. Some of his significant publications include:

Lee, D.L. and Hedahl, B. Holland's Personality Scales Applied to the SVIB Basic Interest Scales. Journal of Vocational Behavior, 1973, 3, 61-68.

Hountras, P.T., Lee, D.L., and Hedahl, B. Relationships Between SVIB Non-occupational Scales and Achievement for Six Holland Personality Types. Journal of Vocational Behavior, 1973, 3, 195-208.

Lee, D.L. and Hall, J.E. Female Library Science Students and the Occupational Stereotype: Fact or Fiction? College and Research Libraries, 1973, 34, 265-267.

B. Reliability and Validity

The reliability and validity data is given in Figure 1 on the next page. The local test-retest data frequently involved different N's because of the individualized nature of the criterion-referenced instruction. These correlations were computed for Raw Scores (number right) on the instruments used in measuring LD remediation.

Following Figure 1, five tables are provided which contain data for the objectives. The tables are sequentially presented and numbered the same as the objectives.

Two products from this project were included with the previous year (FY 1973) Annual Report for Title III ESEA on file at the Division of Plans and Supplementary Centers, United States Office of Education, Washington, D.C.

C. INSTRUMENTATION

FIGURE 1

Obj. No.	INSTRUMENT/AUTHOR	PUBLISHER	RELIABILITY*	VALIDITY
1.	Screening Tests to be used by the classroom teacher (Wold).	Academic Therapy Publications, 1970	Local Test-Retest correlations. Alphabet Writing (Spontaneous)=.57,N=11 Alphabet Writing (Dictation)=.85, N=9 Say letter names & sounds = .63, N=16 Write sounds from dictation=.77, N=17	Face validity for criterion-referenced instruction.
	Classroom Reading Inventory (Silvaroli)	William C. Brown, Co. Publishers, 1965	Word Lists .82 Spelling .91 (Local Test-Retest, N=15) (October '72-April '73)	Face validity for criterion-referenced instruction
2.	Wechler Intelligence Scale for Children (WISC by David Wechsler)	The Psychological Corp., 304 E 45th St. NewYork, NY 10017	Corrected Split-Half from .86 to .90 depending upon age (David Wechsler) .61 locally (Performance) N=10	Correlates .80 with Stanford-Binet (Buros, 5th MMY, 1959 p. 416) Formal diagnostic
3.	Wide Range Achievement Test (WRAT by Jastak, Bijou and Jastak)	The Psychological Corp., 304 E 45th St. New York, NY 10017	Spelling .90, N=6 Arithmetic .85, N=10 Local Test-Retest	Face validity for criterion-referenced instruction
	Key Math Diagnostic Arithmetic Test (Connolly, Nachtman & Pritchett) (pre-school grade 6 mainly)	American Guidance Service Inc., Publishers' Bldg., Circle Pines, MN 55014	.94 - .97 Key Math Diagnostic Arithmetic Manual (pp. 27-30)	Face validity for criterion-referenced instruction.
4.	Northwestern Pupil Behavior Rating Scale (Myklebust) Level I Students (Gr. 1-3)	The Psychological Corp., 304 E 45th St. New York, NY 10017	.56, N=19 Local Test-Retest	Face validity, teacher observation of pupil behaviors.
5.	Northwestern Pupil Behavior Rating Scale (Myklebust) Level II Students (Gr. 4-9)	The Psychological Corp., 304 E 45th St. New York, NY 10017	.84, N=19 Local Test-Retest	Face validity, teacher observation of pupil behaviors.

*Locally Administered Tests for Reliability—Pre-Test = October, 1972—Post-Test = April, 1973—Approximately 6 months between testings.

D. Discussion of Results

The results for Objective No. 1 appear in Table 1, page 10. These results show that the change exceeded the criterion in each instance. Furthermore, using the pre-test mean and standard deviation as a baseline at the 50th percentile, the post test means ranged from the 79th to 96th percentile. This improvement reflected considerable movement for this group of learning disabled children.

Table 2 contains the results for Objective No. 2 on the Wechsler Intelligence Scale for Children (WISC). On the Performance sub-scale the change exceeded the criterion although not to a statistically significant degree. In the view of the tutors, however, the change was educationally significant because the group average moved from the 50th to 69th percentile when the pre-test was used as a baseline for measuring change at the time of post-testing.

The results for Objective No. 3 are found on Tables 3a and 3b. Raw score changes on the WRAT Spelling resulted in a change from the 50th to 73rd percentile, when using the pre-test as a baseline from which to measure. Similarly, the group average on the WRAT Arithmetic changed from the 50th to 90th percentile. Results on the Key Math Test were also indicative of progress with 38 of 42 changes in a positive direction.

Attitude changes as reflected by teacher judgment of behavior are found on Tables 4 and 5. For both Level I and Level II students the changes were observed from pre to post tests to be illustrative of the overall progress students made during remediation.

In conclusion, it should be noted that this project involved a small N, but that for each objective the change exceeded the criterion. The criterion in each instance represented a sizable gain for this type of student and was educationally significant. Since small N's were a factor, non-parametric statistics were also used to further document the degree of change. Statistical significance was reached in all cases except one. Since statistical significance can be reached with much smaller gains when a large research population is studied, the overall change for this small group is worthy of attention.

TABLE 1

Data for Objective No. 1

PRE AND POST TEST MEANS, STANDARD DEVIATIONS AND CRITERION LEVELS ON SELECTED SCREENING TESTS FOR LEVEL I STUDENTS*

TEST	VARIABLE	N	PRE		POST		CHANGE	CRITERION	Wilcoxon T	p level
			MEAN	SD	MEAN	SD				
1. WOLD	Alphabet Writing (Spontaneous)	11	18.54	14.92	38.36	10.10	19.82	7.46	0	.005
2. WOLD	Alphabet Writing (Dictation)	9	11.55	7.40	24.11	6.23	12.56	3.70	0	.005
3. WOLD	Say Letter Names and Sounds	16	31.44	17.84	46.56	7.73	15.12	8.92	0	.005
4. WOLD	Write Sounds from Dictation Con-sounds, blends Diagraphs Vowels - Long, Short, Combination	17	25.47	18.96	47.18	17.10	21.71	9.48	0	.005
5. SILVAROLI	Word Lists	16	40.68	30.28	74.88	30.60	34.20	15.14	0	.005
6. SILVAROLI	Spelling	15	15.53	10.53	24.87	11.91	9.34	5.27	0	.005

* (Participants served as their own controls, pre-post, because of limited numbers served).

TABLE 2

Data for Objective No. 2

PRE AND POST TEST MEANS, STANDARD DEVIATIONS AND CRITERION LEVELS ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN (WISC) FOR LEVEL I STUDENTS

VARIABLE	N	PRE		POST		CHANGE	CRITERION	Wilcoxon T	z	p Level
		MEAN	S.D.	MEAN	S.D.					
1. VERBAL	10	92.00	9.71	98.20	12.09	6.20	4.86	8.5	1.66	.05
2. PERFORMANCE	10	93.10	10.78	98.60	12.45	5.50	5.39	12.5	1.53	.063 (NS)
3. TOTAL	10	92.00	9.67	98.30	11.34	6.30	4.84	7	1.84	.05

TABLE 3a

Data for Objective No. 3

PRE AND POST TEST MEANS, STANDARD DEVIATIONS AND CRITERION LEVELS ON SELECTED SCREENING TESTS FOR LEVEL II LD STUDENTS

TEST	VARIABLE	N		PRE MEAN	PRE S.D.	POST MEAN	POST S.D.	CHANGE	CRITERION	Wilcoxon T	p Level
WRAT	Spelling	6	RS	19.80	10.85	26.33	8.48	6.53	5.43	0	.025
			GE	4.98	1.35	6.75	1.44	1.77	.68	0	.025
WRAT	Arithmetic	10	RS	19.40	4.67	25.60	3.66	6.20	2.34	0	.025
			GE	5.42	1.18	7.15	.96	1.73	.59	0	.025

* RS = Raw Score
GE - Grade Equivalent

TABLE 3b

McNemar Test for Significance of Changes on 42 Key Math Scales for Level II LD Students (N=3)

		POST TEST –	POST TEST +
Pre Test	+	A	B
	–	C	D

		POST TEST –	POST TEST +
Pre Test	+	1	2
	–	1	38

Observed

		POST TEST –	POST TEST +
Pre Test	+	19.5	
	–		19.5

Expected

Chi Square Formula

$$X^2 = \frac{(|A-D| - 1)^2}{A + D}$$

$$X^2 = \frac{(|1 - 38| - 1)^2}{1 + 38} = \frac{(36)^2}{39} = \underline{33.23}, \text{ Significant at .001 level}$$

TABLE 4

WILCOXON TEST OF DIFFERENCE SCORES FROM PRE-POST ADMINISTRATION OF THE PUPIL BEHAVIOR RATING SCALE FOR LEVEL I LD STUDENTS

STUDENT NUMBER	DIFFERENCE SCORES	RANK	SIGNED RANK
1.	12	12	
2.	21	17	
3.	1	2	
4.	-17	16	-16
5.	25	19	
6.	1	2	
7.	16	14.5	
8.	1	2	
9.	16	14.5	
10.	4	4.5	
11.	13	13	
12.	10	11	
13.	-8	10	-10
14.	5	6.5	
15.	-7	9	-9
16.	-6	8	-8
17.	4	4.5	
18.	5	6.5	
19.	22	18	

T = 41

* T is significant at .025 level, 1 tailed test.

TABLE 5

WILCOXON TEST OF DIFFERENCE SCORES FROM PRE-POST ADMINISTRATION OF THE PUPIL BEHAVIOR RATING SCALE FOR LEVEL II LD STUDENTS

STUDENT NUMBER	DIFFERENCE SCORES	RANK	SIGNED RANK
1.	10	17.5	
2.	2	3.5	
3.	2	3.5	
4.	9	16	
5.	2	3.5	
6.	3	9	
7.	3	9	
8.	5	13	
9.	3	9	
10.	3	9	
11.	2	3.5	
12.	3	9	
13.	1	1	
14.	3	9	
15.	13	19	
16.	6	14.5	
17.	6	14.5	
18.	3	9	
19.	10	17.5	

T = O (No negative ranks)

* T is significant at the .005 level, one-tailed test.

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